REMARKS

Claims 1, 3-9 and 11-12 are presently pending in the application. Claims 6-9 and 11-12 remain withdrawn from consideration.

Paragraph [0031] of the specification has been amended to correct a minor typographical error and to recite that the silicon substrate has a <110> directional crystal structure. This amendment is supported at least in paragraphs [0014] and [0017].

Claims 2 and 10 have been canceled and the subject matter thereof incorporated into claim 1. Claims 11 and 12 have been amended to correct the dependency. No new matter has been added by these amendments, and entry is respectfully solicited.

Applicants acknowledge and appreciate the Examiner's indication in the present Office Action that claim 1 is generic to all of the claims. Accordingly, since it is respectfully submitted that claim 1 is allowable for the reasons set forth below, the Examiner is respectfully requested to rejoin all of the pending claims in the application.

In the present Office Action, the Examiner has rejected claims 1-3 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,386,720 of Toda et al. ("Toda"). The Examiner has also rejected claims 4 and 5 under 35 U.S.C. §103(a) as being unpatentable over Toda in view of U.S. Patent No. 4,581,101 of Senoue et al. ("Senoue"). Applicants respectfully traverse these rejections and the arguments in support thereof as follows, and respectfully request reconsideration and withdrawal of the rejections.

Rejection Under § 103(a) Based on Toda

Regarding claims 1-3, the Examiner argues that Toda teaches a method of fabricating a probe including a cantilever, a body supporting the cantilever, and a tip formed at an end of the cantilever. The Examiner contends, referring in particular to Figs. 3A, B, and H-J, that the method of Toda includes all of the claimed steps. Regarding the dependent claims, Toda allegedly teaches that the silicon substrate has a (110) directional crystal structure and that the mask layers are composed of silicon dioxide (col. 5, line 49 to col. 6, line 24). Applicants respectfully traverse this rejection as follows.

The present invention is directed to a straightforward, low cost method of fabricating a probe using a silicon substrate with a <110> directional crystal structure which involves anisotropically etching the silicon substrate. As shown in Figs. 5a-5c and described in paragraphs [0050] – [0052] of the present application, utilization of a silicon substrate having a <110> directional crystal structure and anisotropic etching causes no silicon to remain on the back surface of the cantilever and the etching to stop at the end of the cantilever. These results are not observed when silicon having a <111> surface is used as the substrate. Further, when a SOI (Silicon On Insulator) wafer is used as the substrate, silicon does not remain on the back surface of the cantilever. However, a double side alignment process is necessary, thereby complicating the fabrication process, and the length of the cantilever varies with the thickness of the wafer. Accordingly, by utilizing a silicon substrate with a <110> directional crystal structure as in the method of the invention, a probe exhibiting excellent performance can be easily fabricated without a complicated double side alignment process.

In contrast, Toda discloses an integrated AFM sensor containing a cantilever. The sensor is fabricated from a SOI wafer, formed by bonding together silicon layers having a (100) direction (col. 5, lines 52-58). The substrate does not have the claimed (110) directional crystal structure, and Toda thus does not teach or suggest all of the claimed elements. Further, Toda's reference to the (110) direction which the Examiner refers to (col. 6, lines 11-13) describes the direction of the patterning shape of the resist, not the directional crystal structure of the silicon substrate. Finally, as previously explained, the substrate described by Toda, SOI, is inferior to silicon substrates having a (110) crystal structure for use in the method of the invention since utilizing such a substrate would require a double side alignment process. For these reasons, Toda does not anticipate the present claims, and reconsideration and withdrawal of the §102(b) rejection based on Toda are respectfully requested.

Rejection Under § 103(a) Based on Toda in view of Senoue

Regarding claims 4 and 5, the Examiner acknowledges that Toda does not teach the step of etching using SF_6, He and O_2 gases. However, Senoue allegedly teaches a dry etch process which utilizes these gases, and that variation of gas ratio causes polymer formation. The Examiner argues that Senoue teaches that the formation of polymer residue at a tip diminishes the sharpness of the tip. Accordingly, the Examiner concludes that absent any criticality to the

claimed etching process and given that SF_6, He and O_2 gases are disclosed in Senoue, it would have been obvious to one having ordinary skill in the art at the time of the invention to utilize these gases in a reactive ion etching process based on the teachings of Senoue. Applicants respectfully traverse this rejection as follows.

As previously explained, Toda does not teach or suggest all of the elements of claim 1, such as the (110) directional crystal structure of the silicon substrate. Senoue does not cure this deficiency, since Senoue teaches a dry-etching process using dry-etching treatment of a semiconductor material by action of a gas. Senoue does not teach or suggest a silicon substrate having a (110) directional crystal structure, and thus even the proposed combination with Senoue would not teach or suggest all of the claimed elements. Accordingly, claims 4 and 5 are allowable for at least the same reasons as claim 1, and reconsideration and withdrawal of the §103(a) rejection based on Toda in view of Senoue are respectfully requested.

In view of the preceding Amendments and Remarks, it is respectfully submitted that all of the pending claims are patentably distinct from the prior art of record and in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,

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January 10, 2005 (Date) By: for William S. Galvage, Reg. No. 25,918

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